SOLUTIONS GUIDE CONTENTS

4G BROADBAND SOLUTIONS GUIDE OVERVIEW

WHO IS NewNet ......................................................................................................................1

NewNet 4G SOLUTIONS SERVING CUSTOMERS AROUND THE GLOBE............................2

WHY INVEST WiMAX NOW..............................................................................................3

FLEXIBLE ACCESS POINTS
Access Points: Overview......................................................................................................5
Access Points: Feature Comparison.....................................................................................6

ACCESS SERVICE NETWORK GATEWAY
Access Service Network Gateway: Overview & Comparison............................................7

CONNECTIVITY SERVICE NETWORK
Connectivity Service Network: Overview...........................................................................8

NETWORK MANAGEMENT SYSTEM
Network Management System: Overview............................................................................9

WiMAX CPE DEVICE
CPE Device: Overview.......................................................................................................10
CPE Device: Feature Comparison........................................................................................11

SERVICES FOR BROADBAND
Services for WiMAX: Services and Benefits.................................................................12
Who is NewNet?

NewNet Communication Technologies, LLC is a leading provider of innovative solutions for next generation mobile and fixed line networks. NewNet enables global telecom operators and equipment manufacturers to rapidly develop and deploy cutting edge, revenue generating applications that deliver feature-rich, value added services. With thousands of systems deployed in over 70 countries, NewNet is a recognized leader in providing a synergistic line of robust, carrier grade solutions for wireless, IP, wireline networks and Broadband Solutions.

NewNet’s product offerings includes: The former Motorola Solutions WiMAX end to end wireless broadband product portfolio; TraxcomSecure electronic transaction processing solutions, which deliver services such as mobile payments, e-banking, and e-commerce; Mercury, the industry’s most complete purpose-built, mobile multimedia content delivery platform; and the Total Control PDSN platform, which provides economic delivery of premium mobile data services in CDMA networks. Other products include Distributed, the world’s first standards-based signaling platform, and a short message service center (SMSC), which has been deployed in more than 200 wireless networks worldwide.

NewNet Highlights

Twenty year heritage in Telecommunications and Wireless
Consistant year over year profitable revenue growth
NewNet provides the Foundations for Network Innovation
Complementary forward looking technology and products that have value to our customer base
Packet Data Servicing Node (PDSN)
Secure transaction processing infrastructure (Traxcom)
Mobile multi-media content delivery (Mercury)
4G wireless and mobile broadband solutions (WiMAX)
NewNet Communication Technologies continues to be a global leader in providing innovative solutions for next generation mobile and fixed line networks. We have a customer presence across the globe, with service and support responsibilities for over 180 customers across 92 countries. NewNet Communication Technologies has nearly 300 systems deployed worldwide. NewNet Communication Technologies is headquartered in the United States with sales and support teams located around the world.
Why Invest in WiMAX Now?

Global Demand For Mobile Data Services Isn’t Merely growing...It’s Exploding
What are the data applications driving mobile demand? They certainly include e-mail, Twitter, Facebook, and texting, but they are increasingly including more bandwidth-intensive applications like photo sharing, online gaming and perhaps most important of all, video. The rate at which end users are consuming video – like YouTube, Hulu, sports clips, TV shows and even movies – on their mobile devices is startling.

WiMAX For Smart Meters
WiMAX is an excellent access technology for Smart Meters providing efficient, reliable and secure connectivity. The meters becomes “Smart” when augmented with advanced information, control and communication technologies. First to inter operate, first to deploy, first to demonstrate mobility, first to be certified, focus on collaboration and first to build a WiMAX Smart Meter access network. NewNet provides the products, services, and know-how that WiMAX CSPs need to capture Smart Meter revenue opportunities.

WiMAX for Transportation
WiMAX 802.16e provides full mobility and NewNet has proven ability to provide access to commuters on trains, telecommuting students in cars and buses on their way to and from school, or leisure travelers on their yachts. Whether the Wimax CSP has dedicated transportation needs or looking to expand their network to enable additional services, NewNet’s Wimax solutions can provide fast, reliable mobile broadband.

WiMAX for Public Safety
WiMAX is an excellent access technology for municipalities to provide broadband access. Wimax has enough capacity to stream video surveillance, provide WiFi backhaul between satellite buildings, and enable public workers to communicate and share video, graphics, email, building plans, etc to facilitate quicker resolution of issues and less travel.

Leverage Existing NewNet Equipment for Future Migrations to LTE
NewNet WiMAX Evolution is based on a single RAN (Radio Access Network) solution that reuses 100% of the base station investment. NewNet WiMAX access points are easily upgradable to WiMAX 2 (802.16m) or LTE, providing a solution for all three options and beyond.
NewNet 4G Broadband Portfolio
NewNet offers an end to end portfolio which includes Access Points, Access Service Network Gateway, CPE Devices, Network Management, Connectivity Service Network and Services.

Laser-Focus on Quality
NewNet has embedded Motorola’s quality methodology by committing to develop and manufacture dependable products. WiMAX product testing is done through a comprehensive set of highly sophisticated testing and verification processes, including calibrated RF facilities that prototype, measure and document capability. Recognized as a WiMAX industry leader for best in class products, NewNet has built a true end-to-end ecosystem for delivering fully integrated WiMAX solutions worldwide founded on global presence, technology heritage and industry-leading collaborations in mobile broadband.

Carrier-Grade Services Worldwide
Carrier-Grade Services Worldwide WiMAX commercial deployments are increasing around the globe. These networks are connecting tens of thousands of new people to broadband and surpassing high thresholds for reliable broadband and voice services in demanding markets. NewNet’s WiMAX is a versatile, multi-service platform that delivers the power of WiMAX with the flexibility needed to serve your specific market requirements.

Partnering with you to develop an optimal business model tailored to match your market profile and service goals with focus on speed-to-revenue
Flexible Access Point Portfolio

The WAP portfolio features NewNet flat IP architecture and optional peer-to-peer communication for fast handoffs and low latency. This allows Communication Service Providers to deploy a solution with a truly seamless, rich media experience for the end-user that is also optimized for mobility.

The WAP portfolio reduces costs by using only a simple fiber connection between the RF antenna head and the base control unit. With light infrastructure and no heavy coaxial cables, the WAP 450 can be deployed by a single person and requires less ongoing maintenance. Fast deployment and reduced resource requirements result in faster return on investment compared to typical ground based base stations. WAP 450 comes with a fine tunable scheduler capability that mitigates interference and dynamically changes capacity between the cell edge and the core as the network expands. The fine tunable scheduler capabilities continue to give CSPs a high performance not only during the initial coverage stage but also during the capacity and network expansion stages.

The NewNet Communication Technologies WAP 450 and WAP 650 Series Access Point is available in multiple channel bandwidths (5, 7, or 10MHz) and multiple frequency bands, including 2.3 GHz, 2.5 GHz and 3.5 GHz.

In addition, the WAP 450 may be upgraded with additional hardware to the WAP 650 series that offers multi-carrier capabilities and 20W tower top power outputs with 4x4 antenna capabilities. WAP 450 and WAP 650 are both upgradable to WiMAX 2 (802.16m) or LTE.

NewNet Access Point Advantages

Intelligent Mobility
Super-low latency for voice and data
NewNet WiMAX base stations offer dramatic reductions in handover time and latency with dynamic pre-determination of optimal handover scenarios and pre-processing of admission controls

Common Platform
WiMAX and LTE
By developing products for both LTE and WiMAX utilizing the same base station controller hardware, NewNet is greatly increasing the benefits of scale for both technologies

High Performance
Higher speeds throughout more of the cell
Multi-antenna operations with 2 and 4 element configurations leveraging Dynamic Switching MIMO A & B to provide highest coverage and capacity available from any wireless technology platform today

Ease of Deployment
Low Capex and Opex
The WAP Portfolio enables low opex and capx for operators with simple tower top deployments and zero-footprint baseband installs.
## ACCESS POINT FEATURES COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>Transmit Power</th>
<th>Base Site Architecture</th>
<th>Antenna Elements</th>
<th>Best Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WAP 450</strong></td>
<td>10W Per Sector</td>
<td>Indoor/Outdoor Central base controller unit (BCU)</td>
<td>2 Transmit 2 Receive</td>
<td>High scattering conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One remote radio transceiver units (RRU) per sector with up to 4 sectors supported</td>
<td></td>
<td>Optimal balanced link budget</td>
</tr>
<tr>
<td><strong>WAP 650</strong></td>
<td>20W Per Sector</td>
<td>Indoor/Outdoor Central base controller unit (BCU)</td>
<td>4 Transmit 4 Receive</td>
<td>Multi-carrier capable high scattering conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two remote radio transceiver units (RRU) per sector with up to 4 sectors supported</td>
<td></td>
<td>Enhanced downlink and uplink coverage</td>
</tr>
</tbody>
</table>

**WAP 450**

![WAP 450 Image](image1)

**WAP 650**

![WAP 650 Image](image2)
WiMAX Access Service Network Gateway

The NewNet ASN Gateway provides a rich set of subscriber management features on carrier grade platforms to pursue new businesses and services. Our low density ASN Gateway, ASN 1000 is ideal for small networks to provide cost effective solution. The ASN 1000 can be deployed close to the Access Points to reduce CAPEX and OPEX in distributed architecture as backhaul is a major expense. The ASN 2000 on highly available platform provides higher capacity for large networks and is scalable to provide smooth subscriber growth expansions.

One of the NewNet ASN Gateway unique features is Wholesale that can bring revenue through the resale to Network Service Providers (NSP). Wholesale WiMAX supports varying commercial models with a scalable reference architecture that can facilitate the delivery of services to multiple Network Service Providers. Wholesale provides the downstream NSP the ability to facilitate individual service bundles.

### NewNet WiMAX ASN Gateway Advantages

#### Wholesale Feature
Wholesale enables operators to generate revenue through the resale to other operations by facilitating individual service bundles.

#### Optimized Mobility
With the NewNet ASN Gateway, you will experience seamless handover support, reduced system latencies, and performance enhancements to the mobile link.

#### Carrier-Grade Design
**Compact Platform**
Designed for ease of installation, management and operations, the light infrastructure solutions deliver flexible deployment options and are ready for future growth.

#### Full Suite of Rich Subscriber Management Features

<table>
<thead>
<tr>
<th>ASN 1000</th>
<th>Size</th>
<th>Capacity</th>
<th>Best Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(W x H x D) 44.5 x 22.1 x 50 cm</td>
<td>Up to 2Gbps</td>
<td>Ideal for low density in distributed coverage</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ASN 2000</th>
<th>Size</th>
<th>Capacity</th>
<th>Best Fit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(W x H x D) 44.5 x 44.2 x 42.2 cm</td>
<td>Up to 120Gbps</td>
<td>High capacity networks with future expansion plans</td>
<td></td>
</tr>
</tbody>
</table>

#### QoS Enforcement
QoS enforcement, charging, location and mobility management of WiMAX devices help operators to leverage its Mobile WiMAX network to generate additional revenues.
NewNet Connectivity Service Network

NewNet Connectivity Service Network (CSN) is at the core of the WiMAX network architecture. It provides control and management for the ASN-GW and subscribers with services such as AAA, Policy, and DHCP/DNS/NTP servers.

The placement of the CSN can be co-located with the ASN or geographically separated from it. The CSN can also be deployed geographically redundant.

DNS/DHCP/NTP

The Domain Name Server (DNS) is responsible for translating domain names into IP addresses. The Dynamic Host configuration Protocol (DHCP) Server is responsible for assigning dynamic IP address to devices on a network. DNS/DHCP/NTP is designed as a single unit enabling a smaller footprint with ability to scale.

AAA

NewNet’s Authentication, Authorization, and Accounting Server (AAA) server provides access control for devices across technologies simultaneously (3G, Wimax, LTE, Fixed and Wifi). The policy engine provides flexible control based on device type, location, domain, and service enabling the AAA to provide unique service offerings based on location, realm, access technology, etc. NewNet’s AAA offers wholesale/retail models, multi-vendor support, multi-technology support and fixed and mobile capabilities. Offering a dual stack IPv4/IPv6 and providing multi-certificate support ensures the AAA can handle device authentications expanding needs.

Policy Controller

Policy Controller has sophisticated metering capabilities with highly configurable business rules engine. The Policy Controller can apply a wide range of intelligent, real-time controls, including managing quality of service changes, optimizing high bandwidth, and enforcing usage quotas. Operators have utilized the policy controller in Wimax as a pre-integrated alternative for prepaid. The AAA and policy controller can reside on the same platform ensuring seamless integration and lower capex and opex.
NewNet Network Management System

Network Management and Operations Support Systems OSS are critical to the operational efficiency and the success of every service provider. This functional need can span from managing devices, network elements, business support systems, and managing services. NewNet offers a full range of End-to-End solutions to address the service provider’s needs. In addition to the Network Management products, NewNet offers WiMAX network services that provide advanced performance analysis and reporting customized to the operator’s specific requirements. The customer support services also provide direct access to NewNet subject-matter experts (SMEs) and other technical resources to assist the operator with all operational aspects of the network.

Element Management System

The required Element Management System (EMS) is the operations interface for the Radio Access Network (RAN), providing the operator with an easy-to-use interface for all day-to-day operations including; Fault Management, Configuration Management, Performance Management, and Security Management. (FCAPS).

NewNet offers two EMS models to match any network size: Carrier EMS for High capacity and Low Tier EMS for lower capacity. These commercial hardware platforms utilize the Solaris operating system with an Intuitive Graphical User Interface (GUI), Command Line Interface (CLI) for management functions. In addition to a powerful NorthBound Interface (NBI) provides SNMP, sFTP, and SOAP API protocols for additional analysis.

Network Management System

An optional network management system (NMS) is available to provide a single interface for the network operator to centrally monitor and control the end-to-end (E2E) network. The NMS is an integrated solution that combines both fault and performance management information from other network elements and/or managers in the network. It also helps the network operator to detect and root-cause network faults and alerts the network operator of any service-impacting performance bottlenecks. The NewNet NMS integrates inputs from multiple network and multi-vendor elements to provide a consolidated network operations view with customized Key Process Indicator (KPI) reports. Utilizing a NorthBound Interface with multi-protocol support including; SNMP, SOAP, XML, CORBA, and FTP to link with other OSS systems.

Device Management

Device Management allows the remote management of CPE devices. This functionality provides activation, provisioning, diagnostics, hotlining, and interface for additional applications such as VoIP services. Supports both WiMAX Forum-specified protocols for CPE management: TR-069 and OMA-DM management of individual or multiple device software and configurations. The Newnet device management server provides real-time device monitoring and troubleshooting. Utilizing the simple GUI interface provides complete view of all CPE configuration parameters including current IP address, serial number, device model, etc.
**Wi-Fi & WiMAX Isolation**
NewNet WiMAX devices feature significantly higher Wi-Fi and WiMAX isolation than alternative WiMAX devices. This important feature increases the effective throughput for the end-user and minimizes impact to overall system capacity by reducing resource intensive error correction and scheduler processing.

**Receiver Sensitivity**
All NewNet devices offer best-in-industry receiver sensitivity more than 3 times higher than WiMAX Forum specifications. You can effectively double the area covered by higher order modulation schemes, improving end-user throughput, deepening indoor penetration, and reducing the number of access points required within the service perimeter.

**Plug and Play**
With true Plug-and-Play capability, operators are able to speed time to service and reduce operating costs associated with service turn-up. The WiMAX network automatically detects the NewNet fixed device upon power up and performs the necessary authentication processes. An elegant and user-friendly graphical interface allows end-users to self-diagnose their connections and personalize their service.

**Control and Security**
NewNet WiMAX devices support remote management capabilities allowing administration and health monitoring of the devices from a centralized network or element management system. Advanced security and authentication protocols protect the end-user and the operator from external threats.
### WiMAX CPE Feature Comparison

The NewNet portfolio of devices aligning features and functionality with diverse market requirements and price points

<table>
<thead>
<tr>
<th></th>
<th>Features</th>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ethernet Ports</td>
<td>WiFi b/g/n</td>
<td>VolP Ports</td>
</tr>
<tr>
<td>CPEi 890</td>
<td>2 • 1</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>CPEi 885</td>
<td>2 • 2</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>CPEi 825</td>
<td>1 • 1</td>
<td>• • •</td>
<td></td>
</tr>
<tr>
<td>CPEi 800</td>
<td>1 • 0</td>
<td>• • •</td>
<td></td>
</tr>
<tr>
<td>CPE0 550</td>
<td>1 • 2</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>CPE0 450</td>
<td>1 • 2</td>
<td>•</td>
<td></td>
</tr>
</tbody>
</table>
**NewNet Services for 4G Broadband**

NewNet Services are provided by highly experienced services professionals with proven processes and innovative technology that will ensure you launch your service on-time and on-budget. As you prepare for launch, NewNet can provide Application Services that help you deploy and manage applications to monetize the network, and a service delivery platform to enable an applications ecosystem. We also have the expertise to manage your network, with flexible options based on your requirements and business model. Our people are in every region of the world, and there is no place too remote for us to help you.

With our established, leading-edge network design, systems integration and program management services, supplemented with our proven industry leading experience in successful multi-vendor, multi-technology secured environments, our services have been tried and tested to supply complete solutions as the market moves towards more advanced multimedia, interactive gaming, or Voice over IP (VoIP) services. This expertise enables you to maximize the competitive advantage and efficiencies for your unique WiMAX deployments.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Assess &amp; consult</th>
<th>Plan &amp; design</th>
<th>Deployment</th>
<th>Integration &amp; commercialization</th>
<th>Operations</th>
<th>Optimization &amp; evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Market requirements</td>
<td>• Determine requirements</td>
<td>• Acquire sites</td>
<td>• Component integration</td>
<td>• System level statistics</td>
<td>• Collect &amp; analyze performance data</td>
</tr>
<tr>
<td></td>
<td>• Business case analysis</td>
<td>• Device types</td>
<td>• Site preparation</td>
<td>• System level test and</td>
<td>• Alarm monitoring</td>
<td>• Optimize RF design</td>
</tr>
<tr>
<td></td>
<td>• Spectrum planning</td>
<td>• Application</td>
<td>• Install network components</td>
<td>validation</td>
<td>• Customer monitoring</td>
<td>• Identify users w/ poor performance</td>
</tr>
<tr>
<td></td>
<td>• Technology evaluation</td>
<td>• Capacity projections</td>
<td>• Component test</td>
<td>• Application testing</td>
<td>• Customer trouble tickets</td>
<td>• Identify heavy users</td>
</tr>
<tr>
<td></td>
<td>• Preliminary design</td>
<td>• RF planning &amp; design</td>
<td></td>
<td>• Customer provisioning</td>
<td>• Installation success rate</td>
<td>• Feedback into growth planning</td>
</tr>
<tr>
<td></td>
<td>• Technical &amp; marketing trials</td>
<td>• Backhaul design</td>
<td></td>
<td>• OSS/BSS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Network architecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• OSS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
About NewNet Communication Technologies, LLC

Headquartered in Arlington Heights, IL, NewNet is a recognized leader in mobility technologies with a primary focus in messaging, signaling, wireless broadband, consumer internet, multimedia content delivery, mobile advertising, and secure transaction processing. NewNet Communication Technologies is a part of the Skyview Capital LLC, portfolio of companies. Skyview Capital, LLC, is a private investment firm that specializes in the acquisition and management of companies across multiple sectors of technology, telecommunications, services, and niche manufacturing. For further information, please visit www.newnet.com

Copyright © 2013 NewNet Communication Technologies. All rights reserved.

NewNet Communication Technologies, LLC
1455 W. Shure Drive
Arlington Heights IL, 60004
Tel. +1 224.795.5200